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CLAIMS:

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What is claimed is:

1. A method for managing data elements in bi-directionally growable data structure, the method comprising:

responsive to an indication that a data element is to be placed into the data structure:

advancing a head pointer one memory location in a direction indicated by a state of a direction flag; and

placing a new data element into the memory location indicated by the head pointer.

- 2. The method as recited in claim 1, further comprising:
 swapping the position of the head pointer and a base pointer; and
 reversing the state of the direction flag to indicate growth in the opposite
 direction in preparation for receiving another data element.
- 3. The method as recited in claim 1, further comprising:
 responsive to an indication that a data element is to be removed from the data
 structure:

swapping the head and the base pointers;
reversing the state of the direction flag; and
removing the data element from the memory location indicated by the

head pointer.

4. The method as recited in claim 3, further comprising: moving the head pointer by one memory location in a direction opposite a direction indicated by the state of the direction flag.

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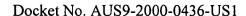
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- 5. The method as recited in claim 1, wherein the data structure is a first in last out data structure.
- 5 6. The method as recited in claim 1, wherein the data structure is a stack data structure.
 - 7. A computer program product in a computer readable media for use in a data processing system for managing data elements in bi-directionally growable data structure, the computer program product comprising:

first instructions, responsive to an indication that a data element is to be placed into the data structure:

for advancing a head pointer one memory location in a direction indicated by a state of a direction flag; and

for placing a new data element into the memory location indicated by the head pointer.

- 8. The computer program product as recited in claim 7, further comprising: second instructions for swapping the position of the head pointer and a base pointer; and
- third instructions for reversing the state of the direction flag to indicate growth in the opposite direction in preparation for receiving another data element.
- 9. The computer program product as recited in claim 7, further comprising:

 second instructions, responsive to an indication that a data element is to be removed from the data structure:

for swapping the head and the base pointers; for reversing the state of the direction flag; and 5

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and





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for removing the data element from the memory location indicated by the head pointer.

- 10. The computer program product as recited in claim 9, further comprising: third instructions for moving the head pointer by one memory location in a direction opposite a direction indicated by the state of the direction flag.
 - 11. The computer program product as recited in claim 7, wherein the data structure is a first in last out data structure.
 - 12. The computer program product as recited in claim 7, wherein the data structure is a stack data structure.
- 13. A system for managing data elements in bi-directionally growable data structure, the system comprising:

first means, responsive to an indication that a data element is to be placed into the data structure:

for advancing a head pointer one memory location in a direction indicated by a state of a direction flag; and

- for placing a new data element into the memory location indicated by the head pointer.
- 14. The system as recited in claim 13, further comprising: second means for swapping the position of the head pointer and a base pointer;
- third means for reversing the state of the direction flag to indicate growth in the opposite direction in preparation for receiving another data element.

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15. The system as recited in claim 13, further comprising:

second means, responsive to an indication that a data element is to be removed from the data structure:

for swapping the head and the base pointers;

for reversing the state of the direction flag; and

for removing the data element from the memory location indicated by the head pointer.

- 16. The system as recited in claim 15, further comprising:
- third means for moving the head pointer by one memory location in a direction opposite a direction indicated by the state of the direction flag.
 - 17. The system as recited in claim 13, wherein the data structure is a first in last out data structure.
 - 18. The system as recited in claim 13, wherein the data structure is a stack data structure.
 - 19. A data processing system, comprising:
- a processor; and

a memory; wherein

the memory comprises a bi-directionally growing stack.

- The data processing system as recited in claim 19, wherein the bi-directionallygrowing stack comprises a dead element stack.
 - 21. The data processing system as recited in claim 19, wherein the bi-directionally growing stack comprises a used element stack.

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- 22. A memory system, comprising:a linear memory array; anda stack stored in said linear memory array;
- wherein as elements are added to the stack, each of the added elements is placed into a next empty memory location at an opposite end of the stack from the end of the stack that a previously added element was placed.
- 23. The memory system as recited in claim 22, wherein the stack is a dead element stack.
 - 24. The memory system as recited in claim 22, wherein the stack is a used element stack.
- 15 25. The memory system as recited in claim 22, wherein as elements are removed from the stack, a next element removed is removed from a memory location at an opposite end of the stack from a location of a previously removed element.